of the display apparatus, and maintaining the shape and/or position of th screen whereby during use the display apparatus has an apparent image distance which, when viewed via the collimating mirror, appears to vary within the total field-of-view of the display apparatus without a user of the display apparatus having to move relative to the screen.

Please delete Claim 36 in the Response last filed.

Marked up copies of the amendments are attached hereto.

REMARKS

The Applicant appreciates the Examiner's thorough review of this application. Reconsideration and re-examination are respectfully requested in view of the instant amendments and remarks.

In paragraphs 1, 2 and 3 of the Office Action the Examiner has rejected claims 25 – 35 as being unpatentable over Wynn in view of Yamasaki et al. The Examiner has not mentioned claim 36. It is assumed that claim 36 was also regarded as unpatentable by the Examiner since it was an independent claim like claim 25. In the present Response it is proposed to delete claim 36.

The Examiner says that Wynn teaches the salient features of the present invention except a method of varying the screen in shape and/or position in order to provide a variable image distance within the total field-of-view of the display apparatus. This particular feature is the key feature of the present invention to Blackham. In order to emphasise the inventive features in the Blackham invention, claim 25 has been amended to more particularly stress the Blackham invention. Some of the wording of independent claim 36 has been used in claim 25 and thus claim 36 is to be deleted as mentioned above.

Claim 25 now makes it clear that the Blackham inventive asp ct has two features as follows:

(i) The curved projection screen is of such a shape and/or position that portions of the screen vary in distance from the curved collimating mirror whereby image distance is not constant across the total field-of-view of the display apparatus.

(ii) The shape and/or position of the curved projection screen is maintained during use of the apparatus whereby, during the use, the display apparatus has an apparent image distance which, when viewed via the collimating mirror, appears to vary within the total field-of-view of the display apparatus without a user of the display apparatus having to move relative to the screen.

It is believed that the above features (i) and (ii) clearly illustrate the differences of the Blackham invention over the invention to Yamasaki et al. More specifically, the Examiner refers to column 8 lines 53 – 57 and 63 – 66 of Yamasaki et al. The Examiner refers to the screen position change in order to vary the image distance within the total field-of-view. It is clear from the text, Figures 9a, 9b and 9c and Figures 13b and 13c that it is the display image that move. More specifically, it is the position of the image on the screen that is moved, Figures 9a, 9b and 9c demonstrating that the horizon has shifted up and down depending on the relative position of the rider. The image in this case must be oversize, i.e. larger than the screen, in order that this may be accomplished. Figures 13b and 13c show the screen remaining stationary, and the bike and rider moving up and down.

Column 8 lines 45 – 53 state that "preferably, the display unit is linked with the motorcycle as shown in Figure 5 such that the relative positional relationship betwe n the eyes of the rider and the display screen is not substantially varied. However, in order to reduce the production cost of the present system, the display unit is provided apart from the model motorcycle so that the moveable carriage 2 is directly placed on the ground as shown in Figure 13". Yamasaki et al moves the position of the image on the screen in order to accommodate the cheaper production costs. Figure 13 shows that the screen does not move. The image is moved up the screen, as shown in Figure 9b, in order that the image is kept at the same height as the rider's eyes. Figure 13 shows the rider rising as acceleration is simulated. Yamasaki et al does not show the image distance varying to any extent. Change in the image distance would be caused by a change in the distance of the rider's head from the screen. The image is always formed on the back projection screen, and therefore any change in image distance would be minimal. Indeed, it is an object of the Yamasaki et al patent to keep this distance to a minimum.

In the Blackham invention, the image is presented onto the screen and this image is viewed by the user via the curved collimating mirror. The apparent image distance varies with the shape and/or position of parts of the screen in relation to the curved collimating mirror. This has been emphasised in the amended Claim 25, and it is not shown in Yamasaki et al. By way of example, it is mentioned that if the Blackham screen is essentially the same shape as the collimating mirror, this may be spherical for example, and has coincident centres, the radius of the screen being half the radius of the collimating mirror, the image will appear to the user to be at infinity. If the screen is moved closer to the collimating mirror, and the radius of the screen is more than half the radius of the collimating mirror, the image will appear to the user to be closer than

infinity. Therefore, by varying the distance betw en the screen and the collimating mirror, the apparent image distance can be varied.

Once the shape and/or position of the screen has been selected, it is fixed in position in relation to the collimating mirror. This feature is now specifically mentioned in the amended Claim 25. This feature gives a display that has image distances that vary across the field-of-view, the image distance being different depending upon which direction the user is looking. During use, neither the position of the image on the screen (compare Yamasaki et al Figure 9) or the screen move. It is the relative geometries of the screen and the mirror that are used to optically vary the image distance within the display, depending upon which direction the user is looking. This is achievable as the display has a large field-of-view.

It is believed that a person skilled in the art would not in any way whatsoever combine Wynn and Yamasaki et al to arrive at the Blackham invention. In support of this, the following points are made:

- The Wynn patent discloses a curved collimating mirror, and Yamasaki et al discloses in Figures 9a, 9b and 9c an image whose position on the screen is varied as the position of the rider varies.
- Wynn is a collimated display, and Yamasaki et al is a directly viewed rear projected display.
- The user of the Blackham invention does not move relative to the screen, so there is no reason to consider moving the position of the image on the screen.
- The Blackham invention is a wide field-of-view display, whereas Yamasaki et al is a limited field-of-view display.

The Blackham invention does not use any of the methods or techniqu s disclosed by Yamasaki et al, and the aim of Yamasaki et al is simply to keep any changes in image distance to a minimum.

In view of the above, it will be seen that Wynn and Yamasaki et al do not teach nor suggest the Blackham invention.

With regard to paragraph 4 of the Office Action, the prior art made of record and not relied upon by the Examiner has been carefully considered. This prior art is not believed to affect the allowability of the amended claim 25, nor the above submissions.

The Applicant relies for allowability of the claims 26 – 35 on the fact that all of these claims include the features of amended claim 25, which amended claim 25 is believed to be allowable for the reasons specified above.

The amendment proposed above for pages 12 line 18 – page 13 lines 3 of the specification is simply to replace the first two paragraphs on page 2 of the Response as last filed with a paragraph that agrees with the amended claim 25.

Accordingly, it is respectfully submitted that this application is in condition for allowance. Early and favorable action is respectfully requested.

If for any reason this RESPONSE is found to be INCOMPLETE, of if at any time it appears that a TELEPHONE CONFERENCE with Counsel would help advance prosecution, please telephone the undersigned or one of his associates, collect in Waltham, Massachusetts, at (781) 890-5678.

Respectfully submitted,

Jason D. Shanske
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(one amended)

25. A method of producing display apparatus, which method comprises providing an enclosed display volume, providing a curved projection screen for being viewed within the enclosed display volume, providing at least one projector for providing an image on the screen, positioning the said at least one projector outside the enclosed display volume, providing a curved collimating mirror within the enclosed display volume and via which the image is viewed, causing the screen to be of such a shape and/or position that portions of the screen vary in distance from the curved collimating mirror whereby image distance is not constant across the total field-of-view of the display apparatus, and maintaining the shape and/or position of the screen whereby during use the display apparatus has an apparent image distance which, when viewed via the collimating mirror, appears to vary within the total field-of-view of the display apparatus without a user of the display apparatus having to move relative to the screen.

AMENDED PARAGRAPH AT PAGE 12, LINE 18 – PAGE 13, LINE 3

It is an aim of the present invention to reduce the above mentioned problems.

The present invention provides a method of producing display apparatus, which method comprises providing an enclosed display volume, providing a curved projection screen for being viewed within the enclosed display volume, providing at least one projector for providing an image on the screen, positioning the said at least one projector outside the enclosed display volume, providing a curved collimating mirror within the enclosed display volume and via which the image is viewed, causing the screen to be of such a shape and/or position that portions of the screen vary in distance from the curved collimating mirror whereby image distance is not constant across the total field-of-view of the display apparatus, and maintaining the shape and/or position of the screen whereby during use the display apparatus has an apparent image distance which, when viewed via the collimating mirror, appears to vary within the total field-of-view of the display apparatus without a user of the display apparatus having to move relative to the screen.